

temperature in eastern and southern Colorado and frost in extreme northern New Mexico; 10th, frost in eastern Colorado and extreme northern New Mexico; 12th, frost in eastern Colorado; 13th, frost in northeastern Colorado; 14th, frost in southern and eastern Colorado and extreme northern New Mexico; 15th, frost in southern and extreme eastern Colorado and extreme northern New Mexico; 19th, frost in eastern Colorado; 24th, probably frost in northeastern Colorado; 29th, frost in northwestern Utah; 30th, frost in Colorado, if sky clears; 31st, frost in northern and western Colorado and southeastern Utah.

These warnings were generally verified by the occurrence of frost or by the ensuing temperature conditions.

No other warnings were issued or required during the month.—*J. M. Sherier.*

SAN FRANCISCO FORECAST DISTRICT

A moderate storm moved southward over the Rocky Mountain region during the first few days of the month and gave light but general rain in the north Pacific States on the 4th, but with this exception only a few scattered showers occurred in this district.

After the first few days the weather became very warm in all portions of this district and continued so throughout the month. This, in conjunction with the prevailing drought caused a condition that was extremely favorable for forest and grain fires, and fire-weather warnings were issued as follows: In northern California on the 5th, and thereafter precautionary warnings were broadcast by radio. On the 22d special daily warnings were commenced to Forest Service stations in Idaho.

It is pleasing to note in connection with the distribution of these warnings that the General Electric Co. in Oakland, Calif., and the Examiner in San Francisco, Calif., are cooperating with this office by broadcasting all warnings by radio, the General Electric broadcasting about noon and the Examiner about 7 p. m.—*G. H. Willson.*

627.41 (73) RIVERS AND FLOODS

By H. C. FRANKENFIELD, Meteorologist

Rains were frequent and occasionally heavy during the month of May over the territory east of the Mississippi River, and as a result floods were numerous, although not of serious character, except over the drainage area of the Potomac River. The floods were most prevalent during the second decade of the month and details regarding all will be found in the table at the end of this report. Lack of space forbids a more extended report.

The Potomac flood occurred from May 12 to 15, and was most severe in the Shenandoah River and in the Potomac from Harpers Ferry, W. Va., to Washington, D. C. Above Harpers Ferry the flood proportions were much less than in March, 1924, although the streets of Cumberland, Md., were again covered with water, with resulting damage of about \$35,000. From Harpers Ferry to Washington and in the Shenandoah River the flood was the severest since the memorable flood of June 1 and 2, 1889, and the damage amounted to about \$1,000,000.

The principal street of Harpers Ferry was under water to a depth of 6 feet at the lowest place, and just above Washington the banks of the Chesapeake & Ohio Canal were washed out for a considerable distance.

When the large area covered by the flood waters is considered, it will be seen that the losses were relatively small. In South Carolina the rivers had been above the

flood stage for so long that livestock could not graze in the lowlands, and but little planting had been done. Elsewhere the most serious aspect was the delay in farming operations.

The flood in the Arkansas River began about April 29 in the vicinity of Wichita, Kans., and extended only to a short distance below Fort Smith, Ark.

Floods in the rivers of Texas and in the Colorado River of Arizona were moderate. Along the Rio Grande in the State of New Mexico conditions were more critical, but fortunately the flood waters passed off without damage of consequence.

As the deficiency in snowfall during the last winter had indicated, the annual rise in the Columbia was very moderate, with no flood stages except at a very few points. Even at these the crest stages were only slightly above the flood stage.

Losses for the month as reported aggregated \$1,118,500, of which about \$1,000,000 occurred in the Potomac River drainage area. Direct crop losses were not large (only \$36,000 reported) but the indirect losses due to delayed farm operations must have been very heavy. About 4,000 acres of farm lands were submerged in the Evansville, Ind., district, 3,000 acres in the Fort Smith, Ark., district, and about 500 acres along the upper Trinity River of Texas.

The value of property saved through the Weather Bureau warnings was \$121,800, not including an estimate of several hundred thousand dollars in Pittsburgh, Pa.

River and station	Flood stage	Above flood stages—dates		Crest	
		From—	To—	Stage	Date
ATLANTIC DRAINAGE					
Connecticut:	<i>Feet</i>			<i>Feet</i>	
White River Junction, Vt.....	15	2	6	16.9	2
Potomac:					
Cumberland, Md.....	8	12	12	13.8	12
Harpers Ferry, W. Va.....	18	9	9	19.0	9
		12	14	27.6	13
Washington, D. C.....	8	13	14	12.1	14
Shenandoah:					
Riverton, Va.....	22	12	13	34.0	12
James:					
Buchanan, Va.....	15	12	13	19.1	13
Columbia, Va.....	18	12	14	31.5	12
Richmond, Va.....	10	13	15	21.0	14
Roanoke:					
Randolph, Va.....	21	12	13	21.7	13
Weldon, N. C.....	30	13	15	38.4	13
		22	23	32.5	22
Tar:					
Rocky Mount, N. C.....	9	16	16	9.0	16
Tarboro, N. C.....	18	18	18	18.0	18
Greenville, N. C.....	14	19	20	14.2	20
Neuse:					
Neuse, N. C.....	15	14	15	15.4	14
Smithfield, N. C.....	14	16	17	14.5	16
Santee:					
Rimini, S. C.....	12	1	11	13.4	4-5
		17	18	12.3	18
		30	31	12.3	31
Ferguson, S. C.....	12	(¹)	12	13.2	6
		18	19	12.1	18
Saluda:					
Pelzer, S. C.....	7	(¹)	(¹)	7.0	Apr. 30
Chappells, S. C.....	14	2	2	14.4	2
EAST GULF DRAINAGE					
Coosa:					
Lock No. 4, Lincoln, Ala.....	17	28	29	18.0	28
Black Warrior:					
Lock No. 10, Tuscaloosa, Ala.....	46	29	30	50.7	29
Pearl:					
Jackson, Miss.....	20	(¹)	(¹)		
MISSISSIPPI DRAINAGE					
Stony Creek:					
Johnstown, Pa.....	10	9	9	11.0	9
		12	12	13.5	12
Kiskiminetas:					
Saltsburg, Pa.....	8	9	9	8.0	9
		12	13	11.0	12

¹ Continued from last month.

² Below flood stage 8 a. m. May 1.

MEAN LAKE LEVELS DURING MAY, 1924

By UNITED STATES LAKE SURVEY

[Detroit, Mich., June 5, 1924]

The following data are reported in the "Notice to Mariners" of the above date:

Data	Lakes ¹			
	Superior	Michigan and Huron	Erie	Ontario
Mean level during May, 1924:				
Above mean sea level at New York.....	Feet 601.19	Feet 579.24	Feet 572.16	Feet 246.10
Above or below—				
Mean stage of April, 1924.....	+0.17	+0.37	+0.39	+0.74
Mean stage of May, 1923.....	-0.38	-0.38	+0.34	+0.48
Average stage for May last 10 years.....	-0.90	-1.35	-0.46	-0.36
Highest recorded May stage.....	-1.86	-4.28	-2.26	-2.85
Lowest recorded May stage.....	+0.37	-0.32	+0.85	+1.14
Average relation of the May level to—				
April level.....		+0.3	+0.4	+0.3
June level.....		-0.2	-0.2	-0.2

¹ Lake St. Clair's level: In May, 1924, 574.56 feet.

EFFECT OF THE WEATHER ON CROPS AND FARMING OPERATIONS. MAY—1924

By J. B. KINCER

The month of May was decidedly unfavorable for agricultural interests in much the greater portion of the country, except that grass and winter grains made rather satisfactory progress in most districts. The weather was persistently cool in nearly all sections east of the Rocky Mountains, and there was too much rain in many localities, especially in parts of the South, and generally from the Ohio Valley northward and eastward. West of the Rocky Mountains severe drought and unseasonably warm weather obtained, which was very detrimental to all dry-land crops, especially to the small grains. Irrigated crops made good progress, but at the same time there was a heavy drain on the water supply, which was becoming short in many sections.

Corn planting was very greatly delayed by the cool weather and frequent showers in central districts east of the Mississippi River. Much corn remained to be planted in the Ohio Valley and Middle Atlantic States at the close of the month, some States reporting that only about half of the crop had been put in. Germination was also unsatisfactory, necessitating much replanting. Between the Mississippi River and Rocky Mountains the drier weather permitted better progress in planting, but it continued too cool for germination and growth in most sections. Corn came up to a fairly good stand in Missouri but was off color, and the general condition in Iowa at the close of the month was very poor.

Winter grains made fairly good growth in most of the principal producing areas, under the influence of the cool, moist weather. During the middle portions of the month moisture was deficient in the western winter-wheat belt, especially in Kansas where some deterioration of the crop was reported. Good rains fell the latter part of the month, however, in this area, which materially

River and station	Flood stage	Above flood stages—dates		Crest	
		From—	To—	Stage	Date
MISSISSIPPI DRAINAGE—continued					
	Feet			Feet	
Monongahela:					
Lock No. 15, Houtt, W. Va.....	22	12	13	27.8	12
Lock No. 10, Morgantown, W. Va.....	25	12	13	27.7	12
Lock No. 7, Martin, Pa.....	30	12	13	38.6	12
Lock No. 4, Pa.....	31	12	14	40.8	13
Cheat:					
Rowlesburg, W. Va.....	12	12	12	12.3	12
Youghiogheny:					
Confluence, Pa.....	10	12	12	11.8	12
Ohio:					
Pittsburgh, Pa.....	22	13	14	26.4	13
Lock No. 2, Coraopolis, Pa.....	26	13	13	26.0	13
Dam No. 6, Beaver, Pa.....	30	13	14	35.5	13
Marietta, Ohio.....	33	14	16	35.8	15
Parkersburg, W. Va.....	36	15	16	37.4	15
Dam No. 22, Ravenswood, W. Va.....	42	15	15	42.0	15
Point Pleasant, W. Va.....	40	14	17	45.4	15
Dam No. 29, Normal, Ky.....	50	15	17	51.2	16
Evansville, Ind.....	35	20	24	36.5	22
Henderson, Ky.....	33	21	24	33.9	22-23
Dam No. 48, Cypress, Ind.....	42	22	23	42.4	22
Muskingum:					
Marietta, Ohio.....	36	15	15	37.4	15
Tuscarawas:					
Gnadenhutten, Ohio.....	10	15	16	10.8	16
Little Kanawha:					
Glenville, W. Va.....	23	12	13	29.7	13
Creston, W. Va.....	20	13	13	23.4	13
Kanawha:					
Charleston, W. Va.....	30	13	13	30.0	13
Elk:					
Clay, W. Va.....	18	12	13	23.6	12
White, West Fork:					
Edwardsport, Ind.....	14	(1)	2	16.1	Apr. 30
Illinois:					
Henry, Ill.....	7	(1)	20	13.5	Apr. 5
Beardstown, Ill.....	12	(1)	12	17.6	Apr. 9
Meramec:					
Pacific, Mo.....	11	29	(2)	17.5	31
Valley Park, Mo.....	14	29	(2)	19.5	31
Bourbeuse:					
Union, Mo.....	10	29	(2)	14.1	31
Arkansas:					
Wichita, Kans.....	9	(1)	1	10.8	Apr. 30
Fort Smith, Ark.....	22	1	3	23.0	2
Dandanelle, Ark.....	20	1	4	21.2	3
Little Arkansas:					
Sedgwick, Kans.....	18	(1)	(2)		
Petit Jean:					
Danville, Ark.....	20	(1)	4	24.7	1
Black:					
Black Rock, Ark.....	14	1	1	14.0	1
Cache:					
Patterson, Ark.....	9	7	9	9.2	8-9
Sulphur:					
Ringo Crossing, Tex.....	20	27	(2)	25.1	30-31
North Platte:					
North Platte, Nebr.....	5	7	11	5.3	10
Osage:					
Warsaw, Mo.....	22	31	31	22.7	31
WEST GULF DRAINAGE					
Trinity:					
Dallas, Tex.....	25	(1)	(2)	29	31.0
Trinidad, Tex.....	28	3	5	29.4	4
Liberty, Tex.....	25	1	6	26.6	3-4
Guadalupe:					
Victoria, Tex.....	16	18	18	17.1	18
Rio Grande:					
Albuquerque, N. Mex.....	4	13	14	4.0	13-14
San Marcial, N. Mex.....	2	(1)	(2)	4.8	17-18
COLORADO DRAINAGE					
Colorado:					
Lees Ferry, Ariz.....	12	7	(2)	14.4	23-24
Parker, Ariz.....	7	(1)	1	7.0	1
		11	(2)	8.9	26-27
PACIFIC DRAINAGE					
Columbia:					
Marcus, Wash.....	24	20	(2)	20.7	27-28
Vancouver, Wash.....	15	24	30	15.3	28-29
Clearwater:					
Kamiah, Idaho.....	14	13	14	14.1	13

¹ Continued from last month.

² Continued at end of month.

³ Below flood stage at 8 a. m., May 1.